

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

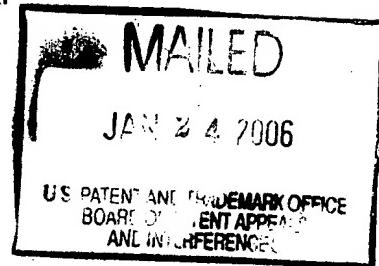
## UNITED STATES PATENT AND TRADEMARK OFFICE

### BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

**Ex parte** Makoto Inai and Hidehiko Sasaki

Appeal No. 2005-2650  
Application No. 09/658,732

HEARD: Nov. 16, 2005



Before KRASS, DIXON, and BARRY, **Administrative Patent Judges**.

DIXON, **Administrative Patent Judge**.

### DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-10 and 12-15, which are all of the claims pending in this application. Claim 11 has been canceled.

We REVERSE.

## BACKGROUND

Appellants' invention relates to a field-effect semiconductor device. A copy of independent claim 1 is reproduced below.

1. A field-effect semiconductor device comprising:

a channel layer;

a contact layer;

a semiconductor structure having an electron-affinity different from those of the channel layer and the contact layer and formed between the channel layer and the contact layer the semiconductor structure having a first junction face between the semiconductor structure and the channel layer and having a second junction face between the semiconductor structure and the contact layer an ohmic electrode formed on the contact layer; and

a Schottky electrode formed on the semiconductor structure;

wherein both of the first junction face and the second junction face are iso-type heterojunctions; and

the semiconductor structure is composed of a single material and includes at least two semiconductor layers.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Sawada et al. (Sawada '032)<sup>1</sup>

5,404,032

Apr. 4, 1995

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<sup>1</sup> We note that the examiner has not applied Sawada '032, but has relied upon the teachings of Sawada '032 as evidence to support the examiner conclusions about what is deemed to have been known in the art and conventional in the pertinent art.

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Sawada et al. "A Super Low-Noise AlGaAs/InGaAs/GaAs DC-HFET with 0.15  $\mu\text{m}$  Gate-Length," Extended Abstracts of the 1991 International Conference on Solid State Devices and Materials, Yokohama, 1991, pp. 353-355. (Sawada)

Enoki et al., "Delay Time Analysis for 0.4- to 5- $\mu\text{m}$ - Gate InAlAs-InGaAs HEMT's," IEEE Electronic Device Letters, Vol. 11, No. 11, pp. 502-504 (Nov. 1990). (Enoki)

Claims 1-10 and 12-15 stand rejected under 35 U.S.C. § 103 as being unpatentable over Sawada in view of Enoki. The examiner additionally relies upon the teachings in Sawada '032 to support the examiner's view of what would have been known to those skilled in the art. (Answer at page 16.)

Rather than reiterate the conflicting viewpoints advanced by the examiner and appellants regarding the above-noted rejections, we make reference to the answer (mailed Mar. 17, 2005) for the examiner's reasoning in support of the rejections, and to the brief (filed Dec. 15, 2004) and reply brief (filed May 17, 2005) for appellants' arguments thereagainst.

## OPINION

In reaching our decision in this appeal, we have given careful consideration to appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by appellants and the examiner. As a consequence of our review, we make the determinations which follow.

**35 U.S.C. § 103**

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. See *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). A *prima facie* case of obviousness is established by presenting evidence that the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed combination or other modification. See *In re Lintner*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). Furthermore, the conclusion that the claimed subject matter is *prima facie* obvious must be supported by evidence, as shown by some objective teaching in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention. See *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Rejections based on § 103 must rest on a factual basis with these facts being interpreted without hindsight reconstruction of the invention from the prior art. The examiner may not, because of doubt that the invention is patentable, resort to speculation, unfounded assumption or hindsight reconstruction to supply deficiencies in the factual basis for the rejection. See *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 177 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). Our reviewing court has repeatedly cautioned against employing

hindsight by using the appellant's disclosure as a blueprint to reconstruct the claimed invention from the isolated teachings of the prior art. **See, e.g., Grain Processing Corp. v. American Maize-Prosds. Co.**, 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988).

When determining obviousness, "the [E]xaminer can satisfy the burden of showing obviousness of the combination 'only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.'" **In re Lee**, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002), citing **In re Fritch**, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). "Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'" **In re Dembiczak**, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of material fact." **Dembiczak**, 175 F.3d at 999-1000, 50 USPQ2d at 1617, citing **McElmurry v. Arkansas Power & Light Co.**, 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993).

Further, as pointed out by our reviewing court, we must first determine the scope of the claim. "[T]he name of the game is the claim." **In re Hiniker Co.**, 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998). Therefore, we look to the

language of independent claim 1 as to recited limitations. Appellants argue that the examiner has failed to set forth a *prima facie* case of obviousness. (Brief at page 6.) We agree with appellants that the examiner did not set forth a *prima facie* case of obviousness of the claimed invention in the non-final rejection mailed May 18, 2004. We find that the examiner essentially restates the brief statement of the grounds of the rejection at pages 4-7 of the answer and then responds to appellants' arguments at pages 7-22 wherein the examiner repeatedly asserts that "Appellant has not disputed" and "they are treated as admitted by Appellant" in addressing those teachings which are not expressly taught or suggested by either Sawada or Enoki. The examiner additionally cites US Patent 5,404,032 to Sawada '032 as to what is known in the relevant art.

The examiner maintains at page 16 of the answer that:

With regard to appellant's argument that "contrary to the Examiner's allegation, Enoki et al. does not teach this. . . The examiner has failed to explain how this very specific teaching of Enoki et al. substantiates his much broader allegations" it should be noted that a reference should not be read too narrowly such that only the embodiment disclosed is the only teaching that can be gleaned therefrom. An example that one of ordinary skill in the art would impress the teaching of Enoki on a broader concept of III-V semiconductor devices can be found in figures 2 and 13, with the supporting text thereof of United States Patent number 5,404,032 (made of record in the P10-892 filed December 5, 2001, see appendix A attached hereto). These figures clearly show HEMT structures based on both AlGaAs-GaAs (figure 2, with a AlGaAs barrier layer) and InP (figure 13, with a InAlAs barrier layer) systems. It is noted that Enoki teaches an In-P based HEMT (see the introduction, section I of Enoki, page 502) and that Sawada teaches an AlGaAs-GaAs based HEMT (see the first line of the abstract of Sawada). Thus, one of ordinary skill in the art when considering such known

art as the (032 reference, would recognize that Enoki's teachings-of a three-layer, n-i-n homojunction barrier structure scheme and it's benefits over a single n-layer barrier structure scheme-have general applicability to HFET barriers composed of various conventional Group III-V material systems, even though Enoki provides an example of only one particular II1-V material system. Namely "that including an undoped layer between sandwiching heavily doped barrier layers and in contact with the gate metal will increase the gate Schottky barrier relative to if the undoped layer was not present, at least when (1) the undoped layer is composed of the same base composition as the doped barrier layers (i.e., the doped/undoped/doped barrier layers form two a few orders of magnitude greater than the undoped layer." Appellant has not provided any proof that this broader concept is not true. The mere fact that Enoki teaches that this broader concept is true for the disclosed n+-InAlAs/I-InAlAs/n+-InAlAs barrier layer in an In-P based InAlAs-InGaAs HEMT is enough teaching for one of ordinary skill to recognize that it would be true for an AlGaAs barrier layer of the AlGaAs-GaAs based HEMT of Sawada arranged in the same doped/undoped/doped fashion. Further, the claims are not directed to a specific III-V layer, but instead are directed to a generic III-V HEMT. Both Sawada and Enoki teach III-V HEMT'S, and thus one of ordinary skill would have recognized that the claimed barrier layer structure scheme that is beneficial for Enoki would also be effective for Sawada based on the broader teaching of Enoki. Therefore, appellant's arguments are not persuasive and the rejection is proper.

We find the examiner's analysis and reasoning to go well beyond the express or implied teachings of both Sawada and Enoki and any reasonable combination thereof if combinable. The examiner's reliance upon the teachings of Sawada '032 is improper since the examiner has not relied upon this reference in the statement of the rejection under appeal and has not introduced the reference prior to the appeal. This reference will be given no consideration since it was not included in the statement of the rejection.

**See Ex parte Raske, 28 USPQ2d 1304, 1305 (Bd. Pat. Appellant. & Int. 1993).**

Additionally, we note that the examiner has not relied upon "Official Notice" for any of

the material argued in non-final rejection or the answer. Therefore, we agree with appellants that the examiner has not set forth a *prima facie* case of obviousness for the reasons set forth by appellant.

From the brief disclosures of Sawada and Enoki, the examiner has asserted that all that is needed to combine the two teachings is conventional in the field of endeavor and not disputed by appellant. We agree that appellants did not dispute these items which may be conventional knowledge since these points were not earlier presented to appellant in an effort to set forth a *prima facie* case of obviousness of the claimed invention. We find that appellants need not controvert these aspects of the examiner's responses since they were not presented in the statement of rejection and not factually supported by the examiner. We find that the examiner did not satisfy the initial burden of showing obviousness of the combination by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. Here, the examiner has made a sweeping statement of the rejection and appellant has correctly pointed out that the express teachings of the prior art references do not establish a *prima facie* case of obviousness by themselves. The examiner then stretches to maintain that those aspects of the field of endeavor are conventional and admitted by appellants. We find this to be unreasonable for the examiner to apply a combination which is facially deficient and then maintain that the wealth of knowledge not discussed

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is conventional and admitted by appellants without applying any additional references to support these contentions against the claims. Appellants are left to guess and speculate prior to receiving the answer and then still having no FACTUAL basis/evidence with which to evaluate the propriety of the rejection and make an informed response.

Additionally, we note that the examiner has withdrawn the final rejection and made the present non-final rejection which appellants now appeal. This is not compact prosecution by the examiner and the facially deficient rejection leaves us wondering what the examiner is doing. We suggest that the examiner do a complete search, apply the best art found and provide a factual basis in the statement of the rejection for those assertions not expressly found within the four corner of the references applied against the claims. (Fill the gaps in the teachings and in the knowledge needed to make the combination.) To do less is to fail to establish a *prima facie* case of obviousness due to a lack of evidence which may be available and easily applied.

In addition to the argument of the lack of the initial showing of a *prima facie* case, appellants argue that Sawada does not teach the use of an undoped layer for lowering resistance and that the examiner's combination would increase the resistance. (Reply brief at pages 2-5.) We agree with appellants that the examiner has not shown where Sawada and Enoki teach this feature. Additionally, appellants argue that the examiner has not shown that the inclusion of the undoped layer in the barrier layer of Sawada will increase the Schottky barrier. (Reply brief at pages 7-10.) We agree with appellants that the examiner has not provided a showing to establish the *prima facie* case of obviousness, and we cannot sustain the rejection of independent claims 1 and 15 and their dependent claims.

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## CONCLUSION

To summarize, the decision of the examiner to reject claims 1-10 and 12-15 under 35 U.S.C. § 103 is REVERSED.

**REVERSED**



ERROL A. KRASS  
Administrative Patent Judge



JOSEPH L. DIXON  
Administrative Patent Judge



LANCE LEONARD BARRY  
Administrative Patent Judge

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